

NASA and Public Private Partnerships



Gary Martin

Director, New Venture and Communication!
Ames Research Center!



NASA Public Private Partnerships!



" **NASA Headquarters, Washington, DC [Management]** # Management over the space flight centers, research centers, and other installations that constitute NASA!



" **Ames Research Center, California [Research]** # Research geared towards creating new knowledge and new technologies that span the spectrum of NASA interests!



" " **Dryden Flight Research Center, California [Research]**# Lead for flight research !



Glenn Research Center, Ohio [Research]# Develops and transfers critical technologies for aeronautics, aerospace, and space applications!



! **Goddard Space Flight Center, Maryland [Mission]** # Expand knowledge on the Earth and its environment, the solar system, and the universe through space observations!



Jet Propulsion Laboratory [Mission] # Managed by the California Institute of Technology is lead center for robotic exploration of the Solar System.!



NASA Public Private Partnerships!



- ! **Johnson Space Center [Mission] #**
Leads NASA's effort in Human Space Exploration!
- ! **Kennedy Space Center [Launch Operations] #**
Preparing and launching missions around the Earth and beyond!
- ! **Langley Research Center [Research] #**
Aviation and space research for aerospace, atmospheric sciences, and technology commercialization to improve the way the world lives!
- ! **Marshall Space Flight Center [Mission] #**
Access to space and use of space for research and development to benefit humanity!
- ! **Stennis Space Center [Propulsion Test] #**
Rocket propulsion testing and for partnering with industry to develop and implement remote sensing technology!



NASA Public Private Partnerships!



NASA Center Locations

● AMES

● DRYDEN

JPL ●

GLENN ●

HEADQUARTERS ● GODDARD

LANGLEY ●

MARSHALL ●

JOHNSON ●

STENNIS ●

KENNEDY ●





There are Many Ways to Build Public-Private Partnerships with NASA



- " Space Act Agreements (Non-Reimbursable, Reimbursable, Memorandum of Understanding, Memorandum of Agreement, Interagency, and International) !
- " Licensing Agreements (Exclusive, Nonexclusive, and Limited Exclusive) !
- " Software Agreements!
- " Cooperative Research and Development Agreements (CRADA)!



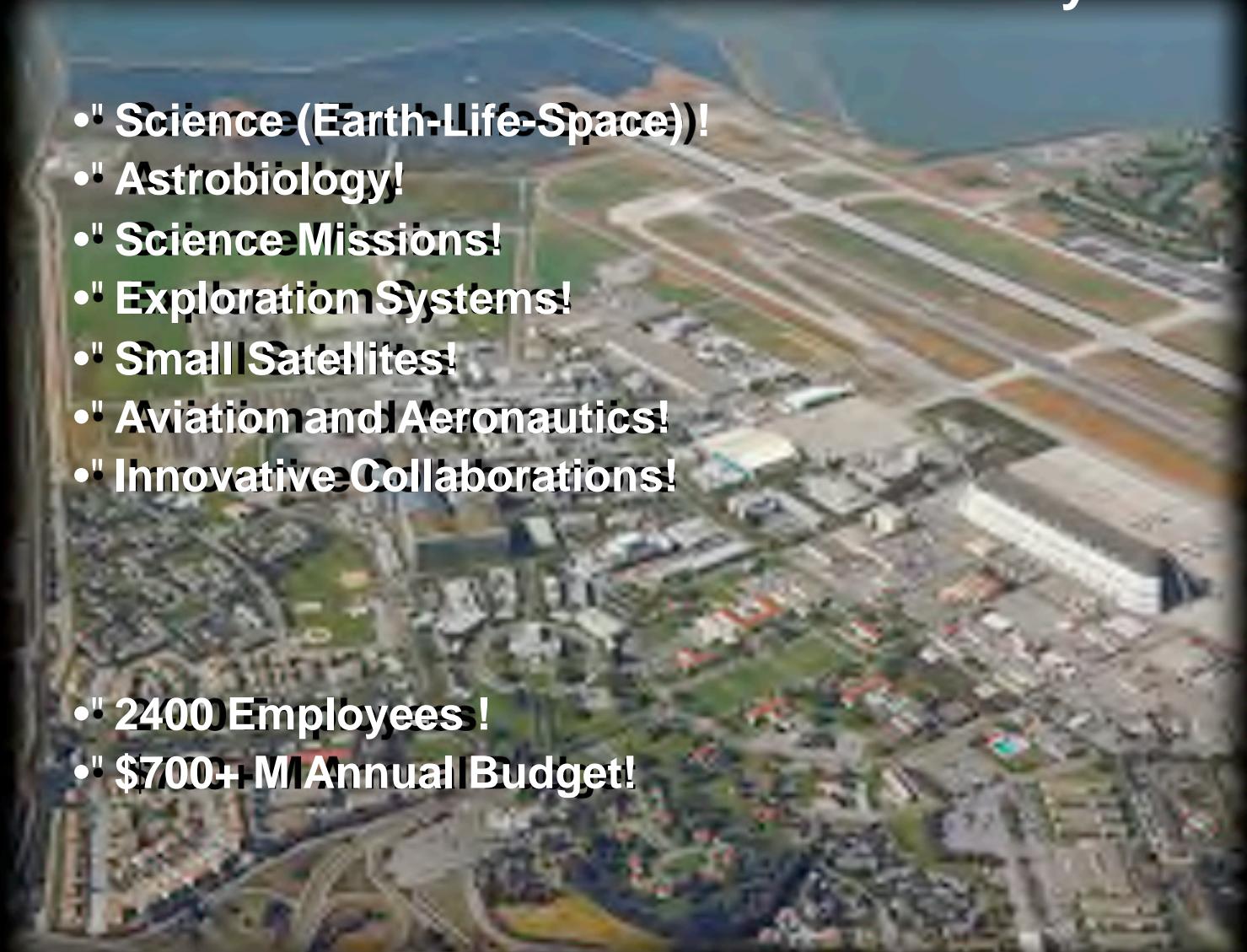
NASA Public Private Partnerships!



NASA Ames Research Center Today!

- " Science (Earth-Life-Space)!"
- " Astrobiology!"
- " Science Missions!"
- " Exploration Systems!"
- " Small Satellites!"
- " Aviation and Aeronautics!"
- " Innovative Collaborations!"

- " 2400 Employees!"
- " \$700+ M Annual Budget!"





NASA Public Private Partnerships!



Facilities !



National Full Scale Aerodynamic Complex, 80x120 Wind Tunnel



Vertical Motion Simulator



Small Spacecraft Development Facility



Unitary Plan Wind Tunnel



SOFIA



Machine Shops



Small Satellite Lab



Columbia Super Computer



Ballistic Range



Arc Jets



Image copyright Dariusz Jezewski



Airfield and Hangars



NASA Public Private Partnerships!



Ames Technology Areas!



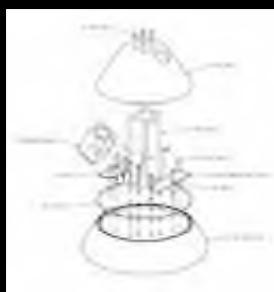
Aerospace and Aeronautics



BioTech/Biomedical



Integrated Systems Health Management (ISHM)



Systems Engineering and Design



Nanotechnology



Robotics and Artificial Intelligence



Materials Science and Entry Systems



Software and High-end Computing



NASA Public Private Partnerships!



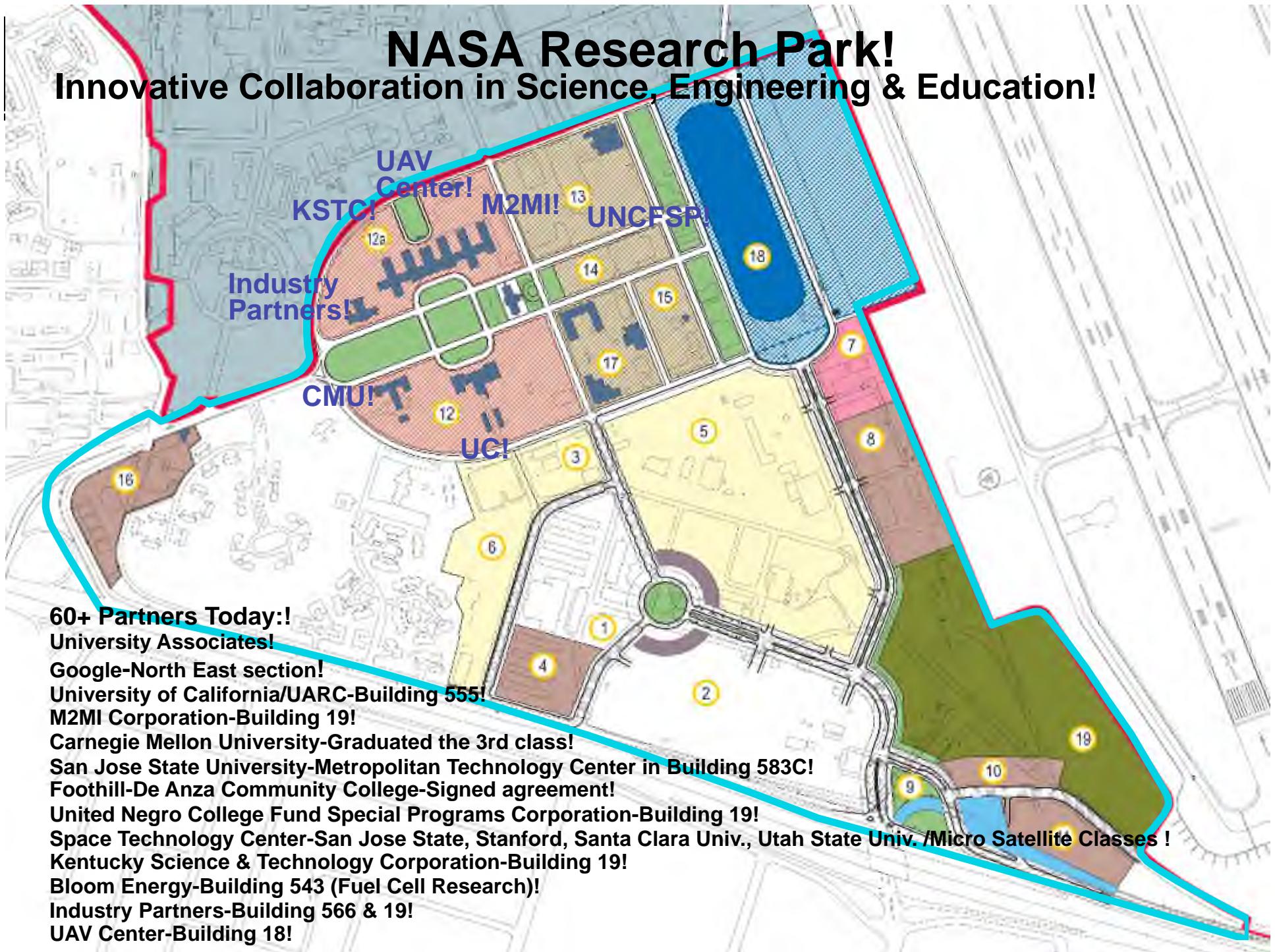
NASA Silicon Valley Partnerships!

NASA Ames uses its Silicon Valley location to create! innovative partnerships with ! cutting-edge industries and! leading universities to conduct applied research ! and produce technologies ! that enable NASA missions. !



NASA Research Park!

Innovative Collaboration in Science, Engineering & Education!





Google!

- " 40-year agreement!
- " **Google will lease 42.2 acres of unimproved land in the NASA Research Park to construct up to 1.2 million square feet of offices and research and development (R&D) facilities and housing in a campus-style setting !**
- " **NASA and Google are planning to work together on a variety of areas, including large-scale data management, massively distributed computing, bio-info-nano convergence, and encouragement of the entrepreneurial space industry. !**





NASA Public Private Partnerships!



University Associates!

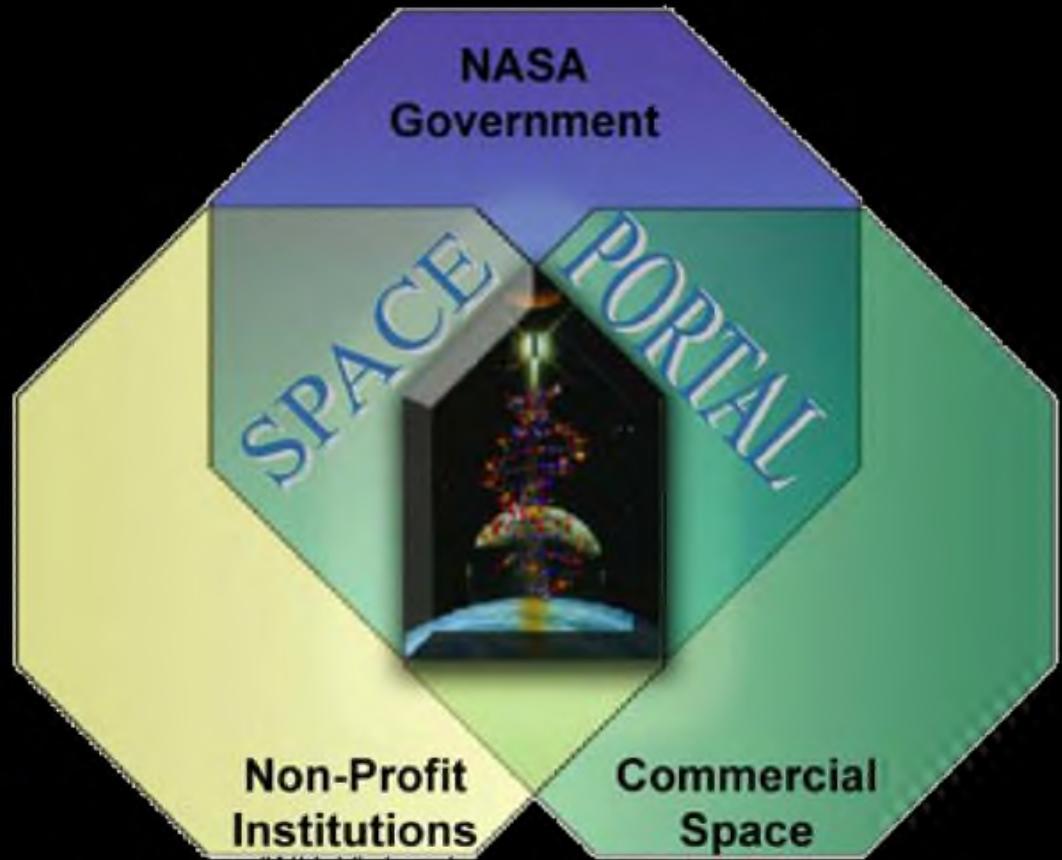
The University of California Santa Cruz (UCSC) and Foothill-De Anza Community College District will partner with NASA Ames to establish a sustainable community for education and research at the NASA Research Park (NRP). !





Emerging Commercial Space Office!

- " NASA partnerships to explore collaboration in space launch systems and payloads launched from aircraft!
 - " NASA Ames will become a West Coast 'space portal' for affordable small satellites and other scientific and commercial payloads!
 - " Areas of collaboration to include mission, vehicle, and payload concept analyses; systems engineering; and payload integration, as well as use of NASA Ames' facilities, such as its wind tunnels, arc-jet facility, flight simulators





NASA Public Private Partnerships!



Some Partners of NASA Ames!



bp



Carnegie Mellon



Bodega Algae, LLC



Pipeline Research Council International

LOCKHEED MARTIN



St. Lawrence Energy Corporation

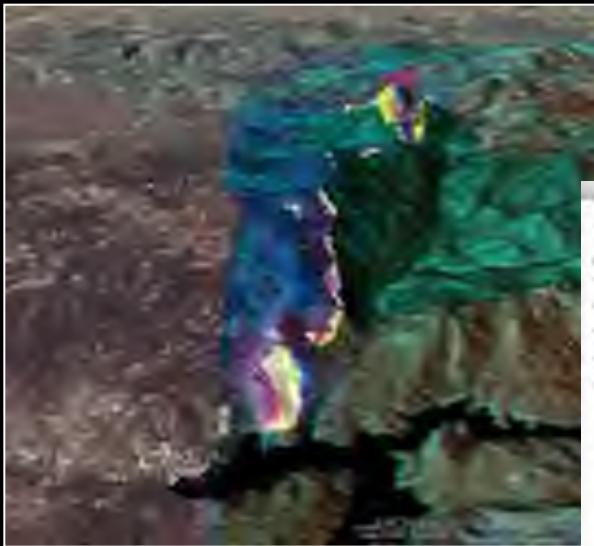


STANFORD
UNIVERSITY

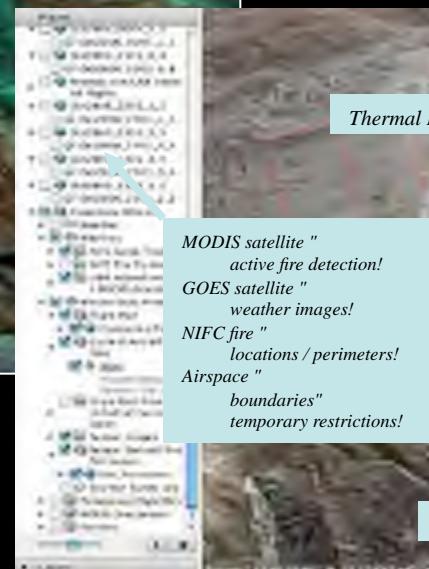




NASA Public Private Partnerships!



US Forest Service !
NASA Dryden!
State of California !
Federal Aviation Administration !



Wildfire Monitoring!

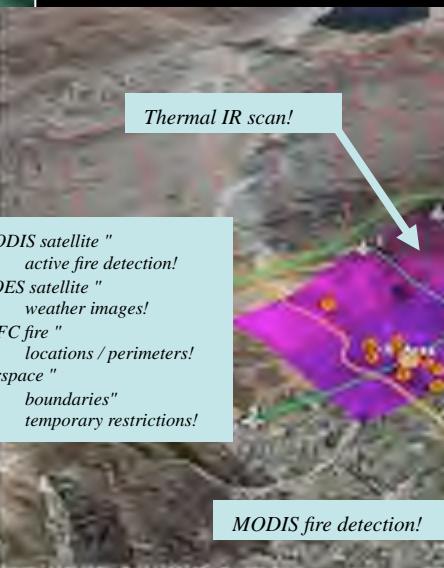
Real-time monitoring of Western States Wildfires!

Remote sensing with autonomous modular sensor!

Deployment of ground, aerial (UAV#s), and orbital assets!

Integration of weather data (images and maps)!

Distributed data communication!



UAV pose!

MODIS fire detection!

Thermal IR scan!

MODIS satellite "active fire detection!"
GOES satellite "weather images!"
NIFC fire "locations / perimeters!"
Airspace "boundaries" temporary restrictions!

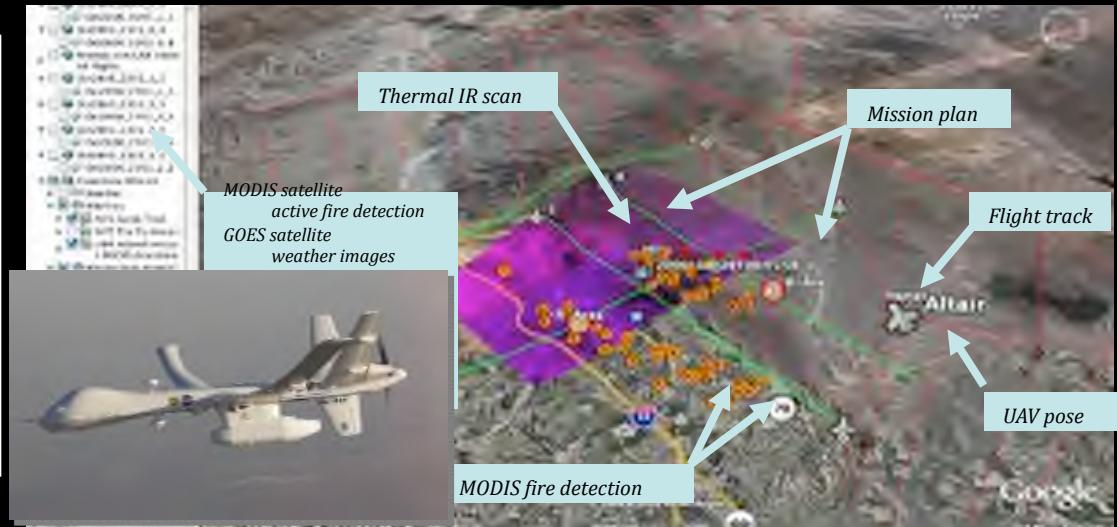
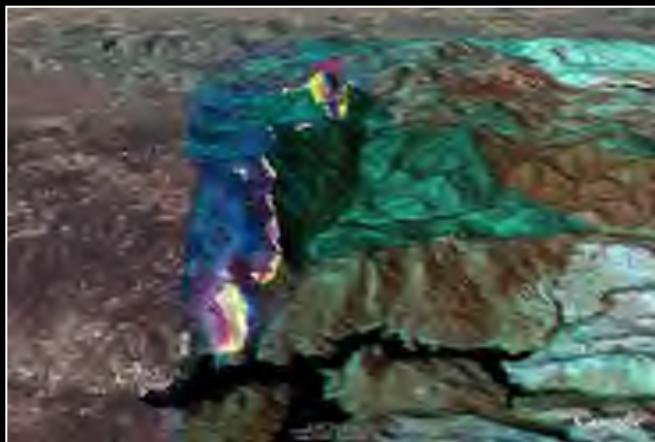


Partnership Example: Wildfire Monitoring!



Real-time monitoring of Western States Wildfires!

- " Remote sensing with autonomous modular sensor!
- " Deployment of ground, aerial (UAVs), and orbital assets!
- " Integration of weather data (images and maps)!
- " Distributed data communication!





NASA Public Private Partnerships!



Disaster Imaging & Response

- " Improving Situational Awareness, Coordination and Speed of Response
 - Rapid image processing/overlay of satellite imagery
 - Geo-positioning of aerial fly-over imagery
 - Integrated view of disaster zones



Carnegie Mellon!
Google!
Urban Search & Rescue!

Aerial "recon"



NASA Public Private Partnerships!



Pipeline Rights-of-Way (RoW) Surveillance!

Third-party strikes to the nation's liquid and gas pipeline infrastructure are the leading cause of damage and spills, posing significant hazards to the general public and the environment!



Rights-of-Way Autonomous Monitoring (RAM)

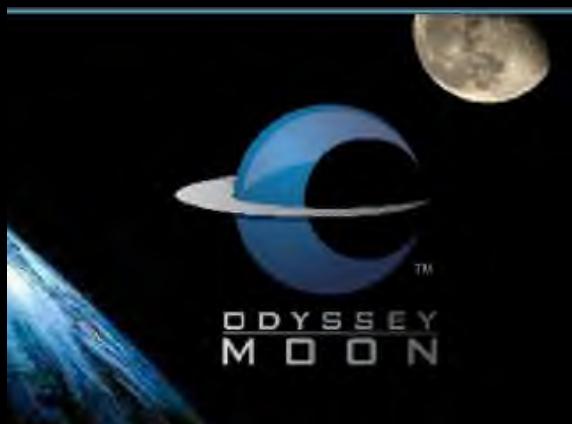


Remotely detect intrusions into liquid pipeline rights-of-way and releases from liquid/gas pipelines via sensors and imaging systems on small manned and Unmanned Aircraft Systems (UASs)

Pipeline and Hazardous Materials !
Safety Administration!
British Petroleum!
Pipeline Research Council International!



NASA Public Private Partnerships!



Odyssey Moon Ventures LLC!

Common Spacecraft Bus Development

- Collaborate on the assessment of NASA ARC's Common Spacecraft Bus (CSB) design for use on a commercial space mission. !
- OMV intends to conduct a series of robotic missions to the moon in support of science, commerce, and exploration!



NASA Public Private Partnerships!



SpaceX Partnership



Thermal Protection System Material Design and Analysis for the Space Dragon Capsule

- "The Space X Dragon Spacecraft has been selected as one of the winners of the NASA Commercial Orbital Transportation Services (COTS) program!
- "Successfully demonstrated December 2010!
- "NASA received funding for its engineering efforts to analyze and develop the Thermal Protection System (TPS) and thermal control system!
- SpaceX obtained expert engineering support services from experienced NASA personnel.!



NASA Public Private Partnerships!



Planetary Skin!



Capturing, collecting, analyzing and reporting data on environmental conditions around the world!





NASA Public Private Partnerships!



Publicizing NASA Technology!



Website - <http://technology.arc.nasa.gov>



partnership



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